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Tung

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(54) **SCUPPER JOINT FOR SHIP**

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F16L 3/04 (2006.01)

(52) **U.S. Cl.** **285/139.1**; 114/182

(58) **Field of Classification Search** ..... 285/139.1, 285/139.2, 139.3, 206, 208, 205, 239; 114/182, 114/183 R

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

954,269	A *	4/1910	Durkee	285/205
1,393,089	A *	10/1921	Collie	285/206
2,137,223	A *	11/1938	Baxter	285/206
3,177,014	A *	4/1965	Bergstrom	285/206
5,273,466	A *	12/1993	Thompson	440/88 R
5,456,499	A *	10/1995	Sharpe	285/206
5,722,339	A *	3/1998	Gross	114/183 R
5,806,454	A *	9/1998	McKiernan et al.	285/139.1
6,038,992	A *	3/2000	Smith	114/183 R
6,164,231	A *	12/2000	Shimmell et al.	114/182
6,736,081	B1 *	5/2004	Green et al.	114/183 R
7,210,423	B2 *	5/2007	Haugen	114/183 R

* cited by examiner

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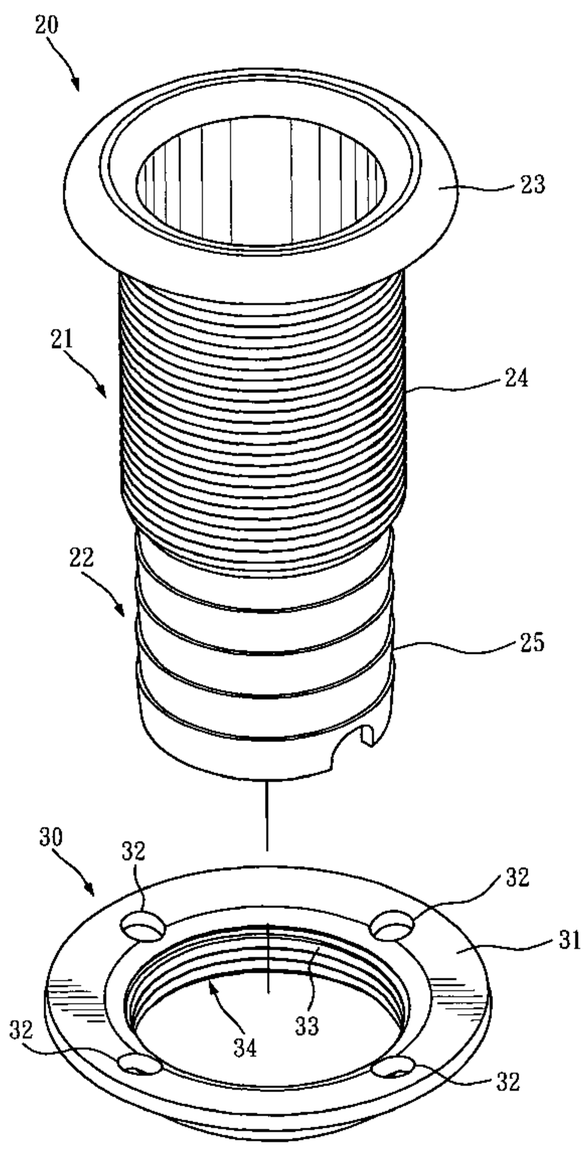
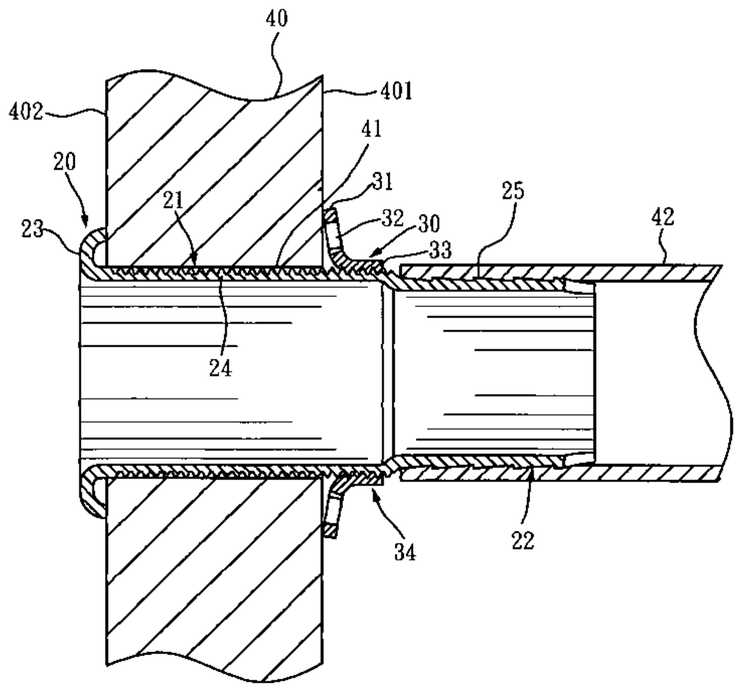
(57) **ABSTRACT**

A scupper joint for a ship includes a body and a nut. The body has a tubular structure as a piece cut from a seamless tube. The tubular structure has a first section and a second section. The first section has a flange at one end thereof as an evagination and a threaded segment at an outer periphery thereof. The second section has at least one annular protrusion at an outer periphery thereof. The nut has an annular structure. The tubular structure has an end evaginated to form a flange and has an inner wall threaded to form a threaded segment. The threaded segment of the nut and the threaded segment of the first section are configured to couple with each other.

3 Claims, 6 Drawing Sheets





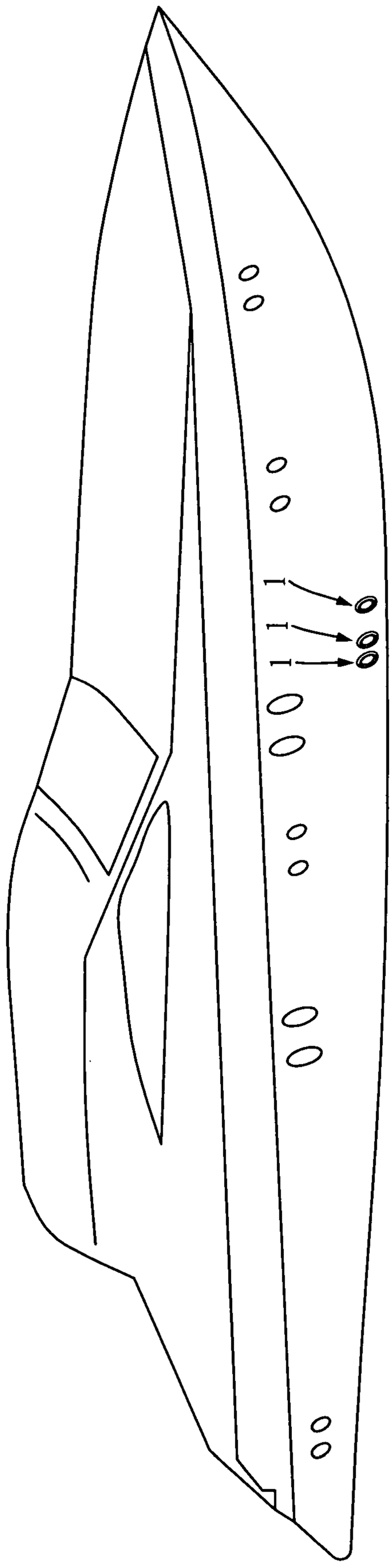


FIG. 1

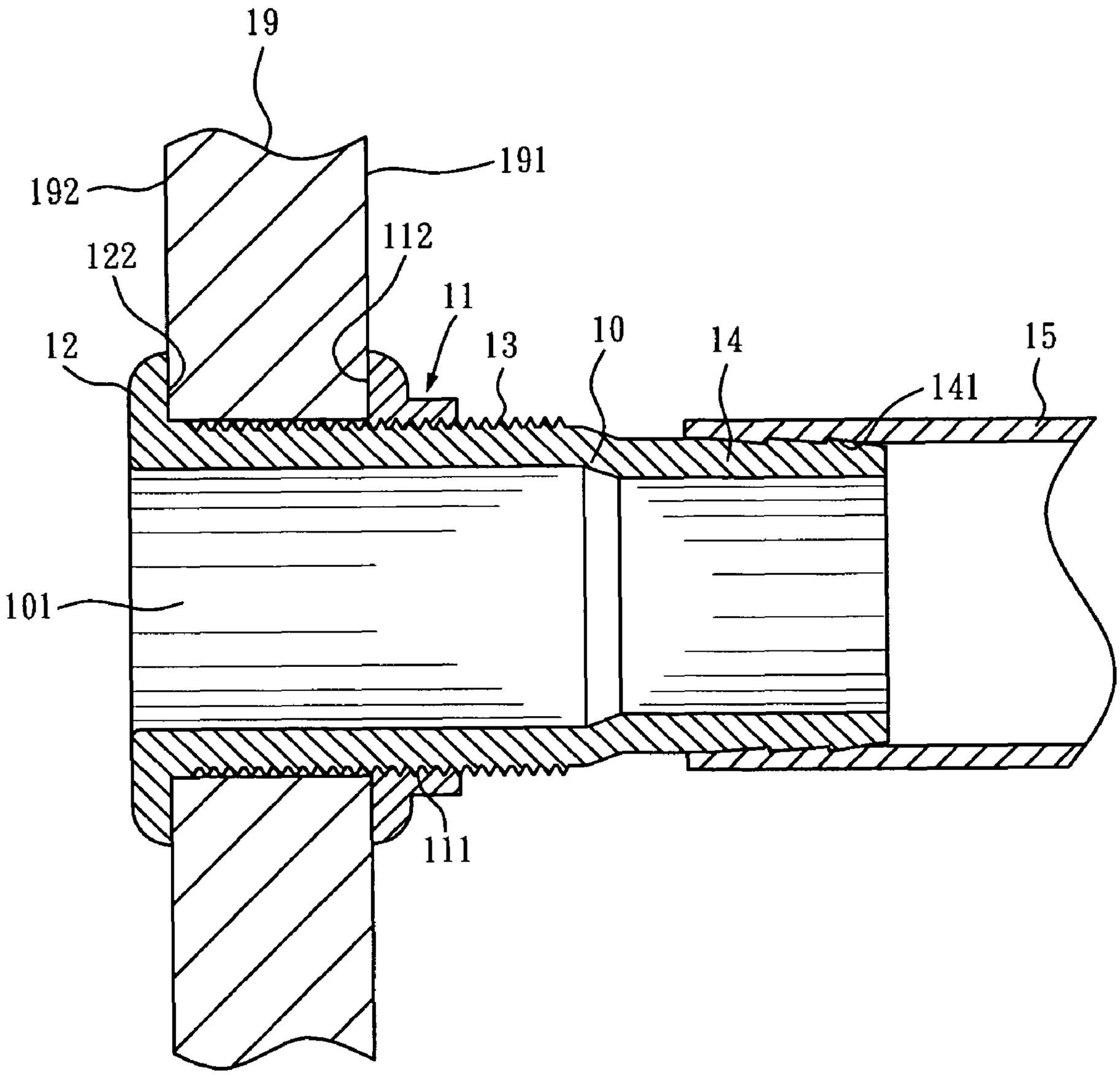


FIG. 2 PRIOR ART

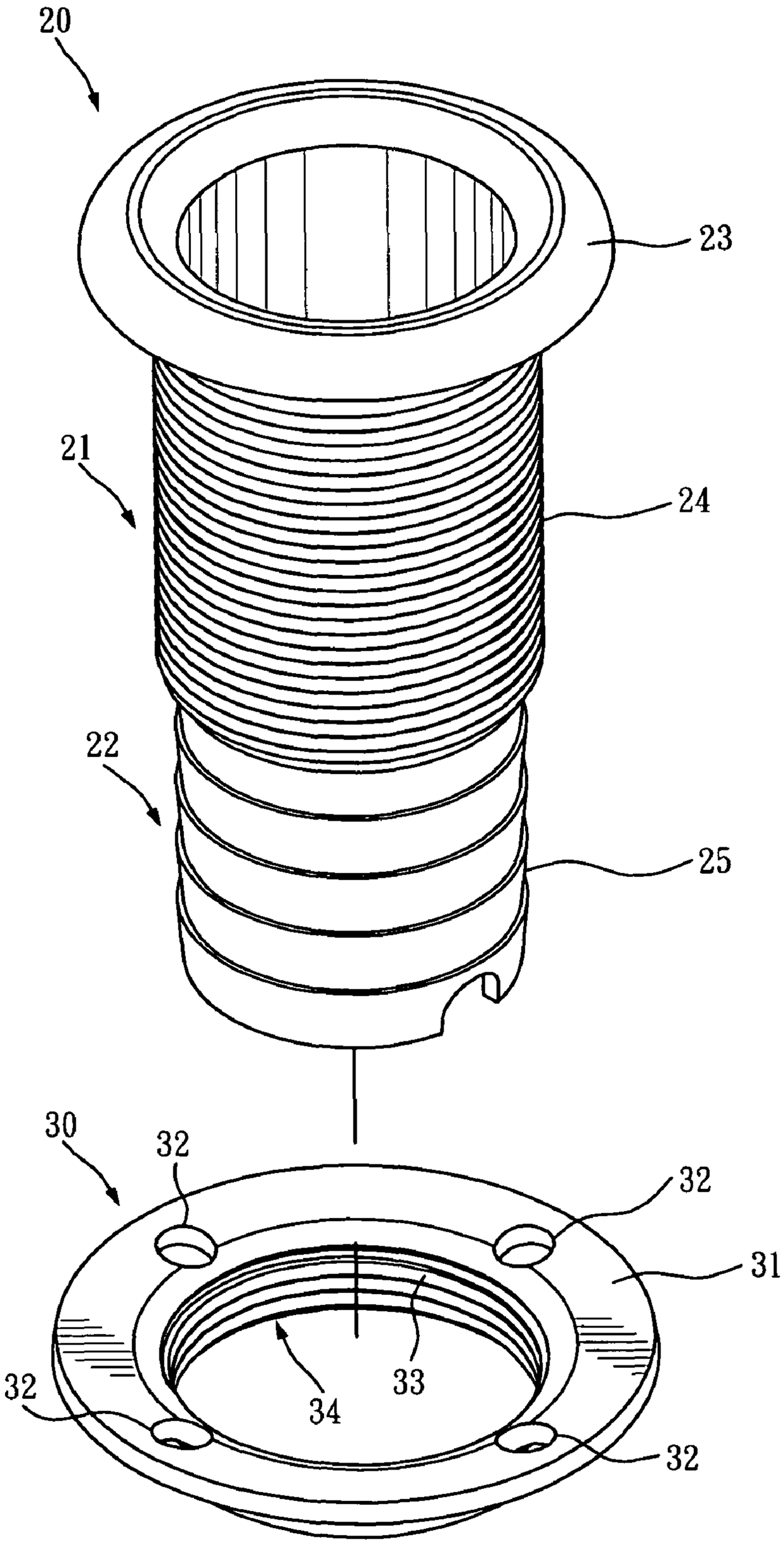


FIG. 3

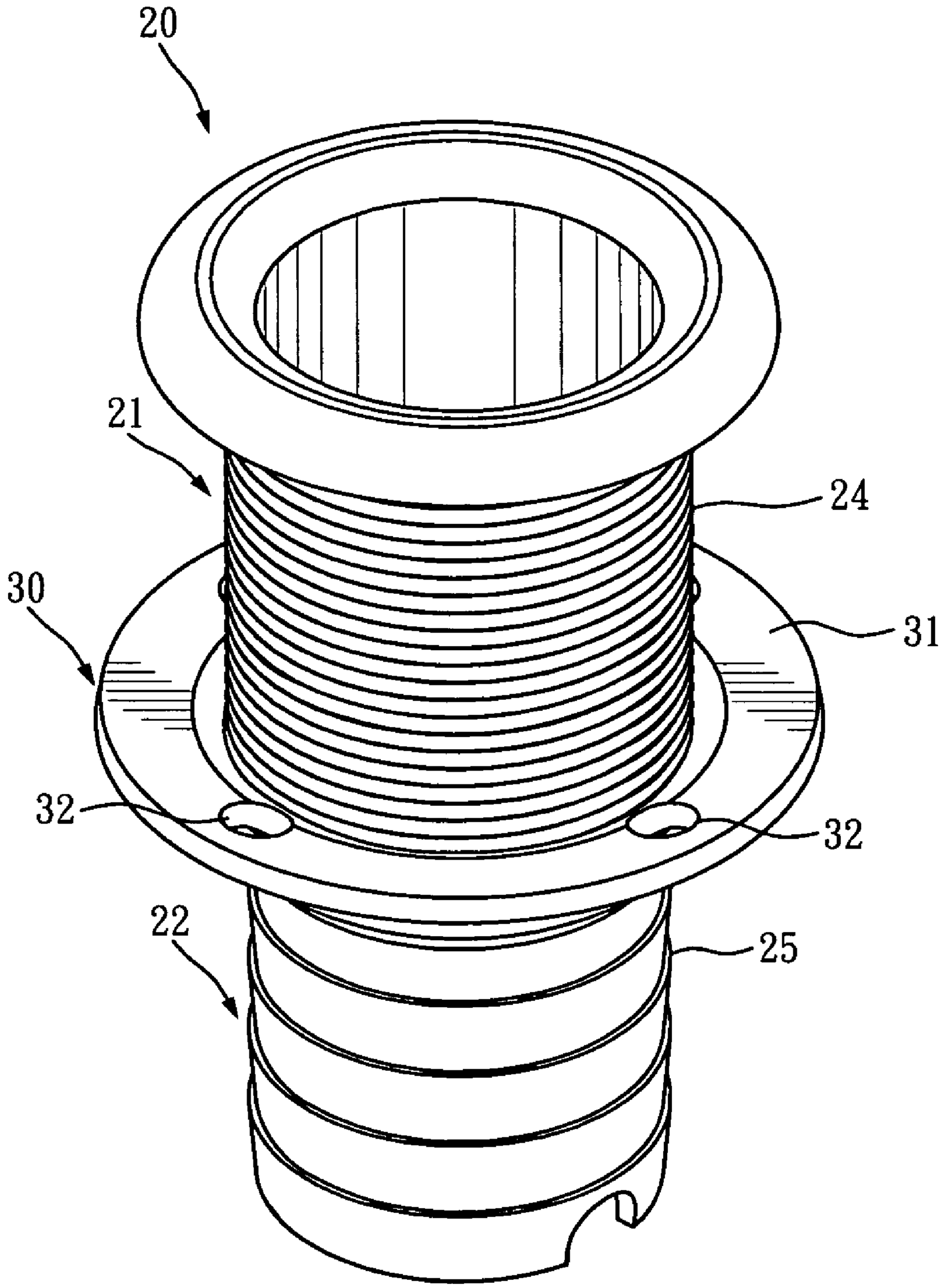
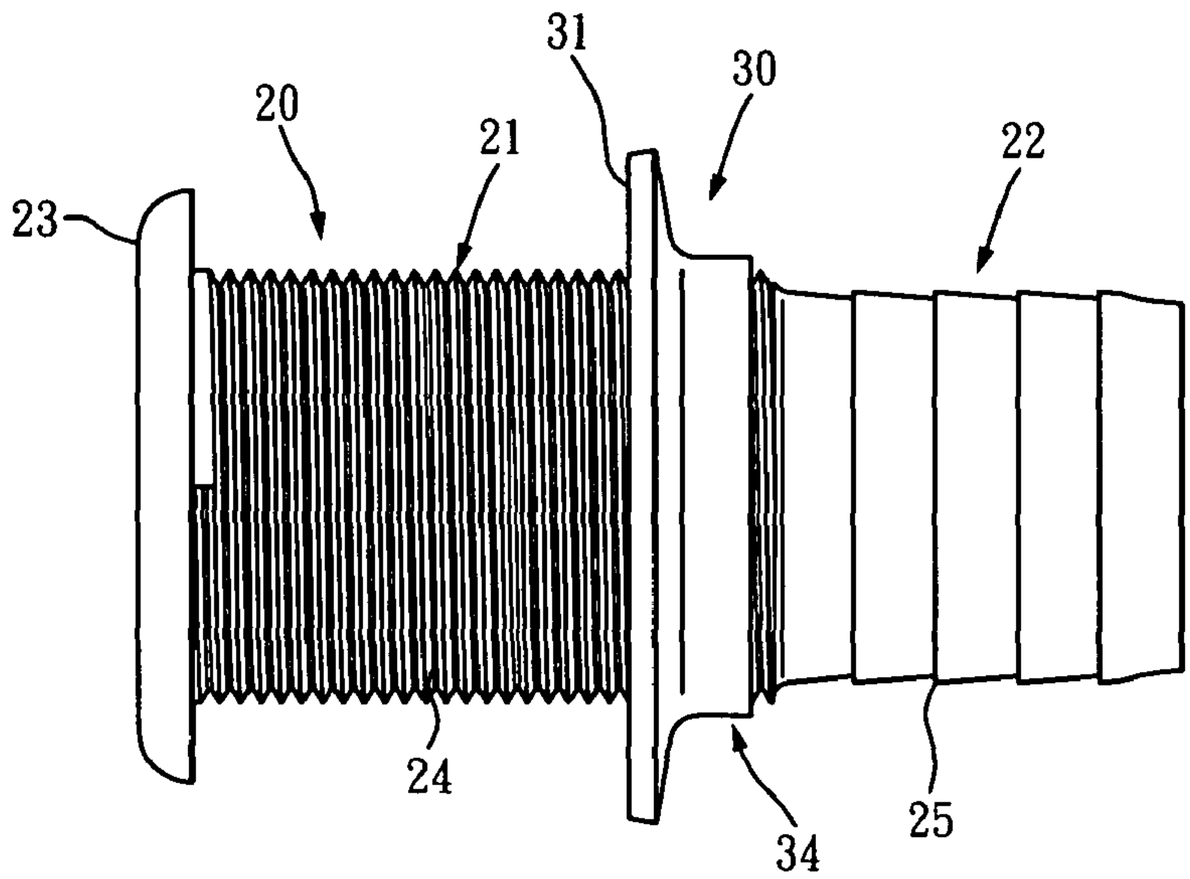


FIG. 4


31
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21
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23
24
25
34

FIG. 5

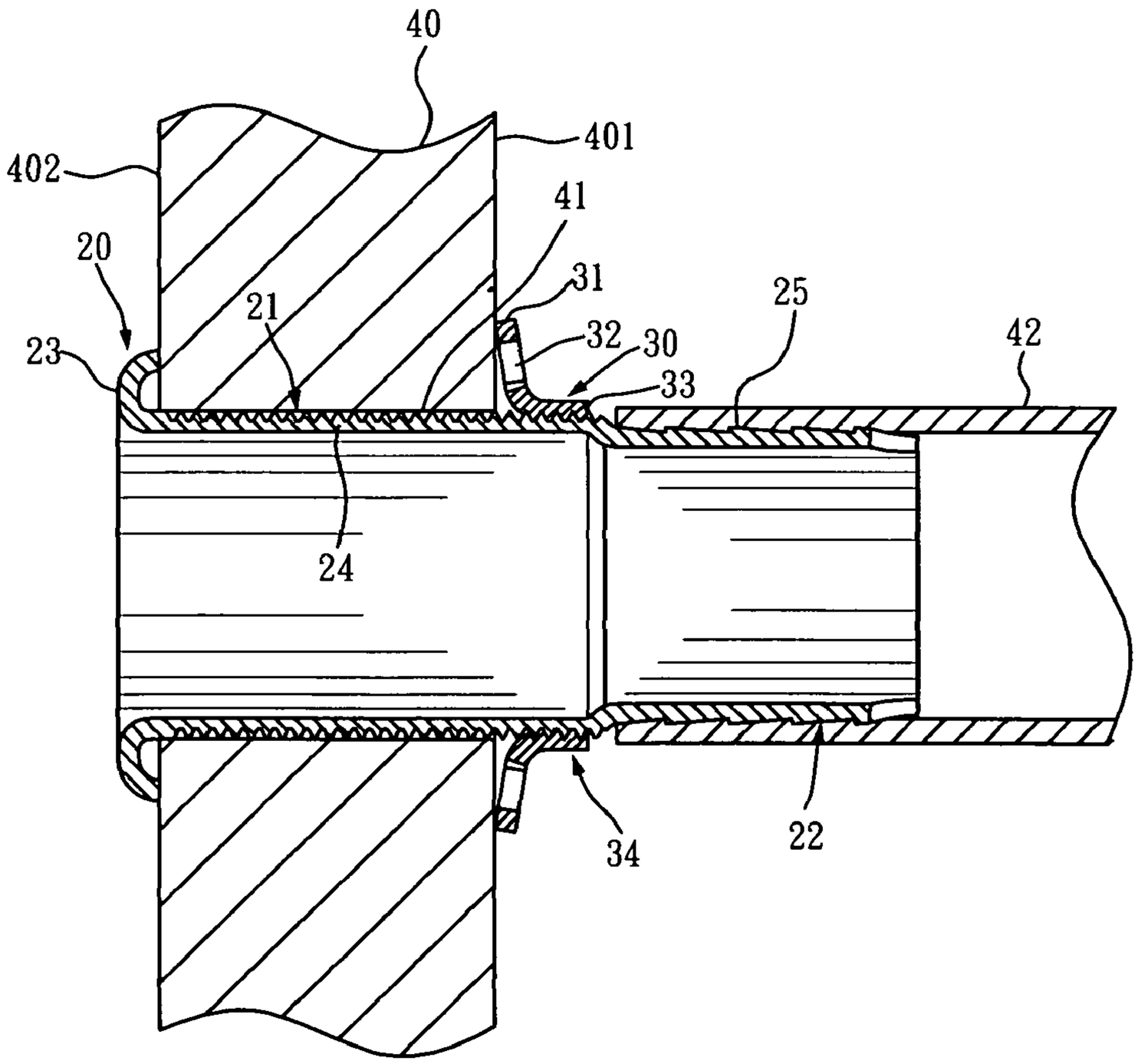
40
401
402
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FIG. 6

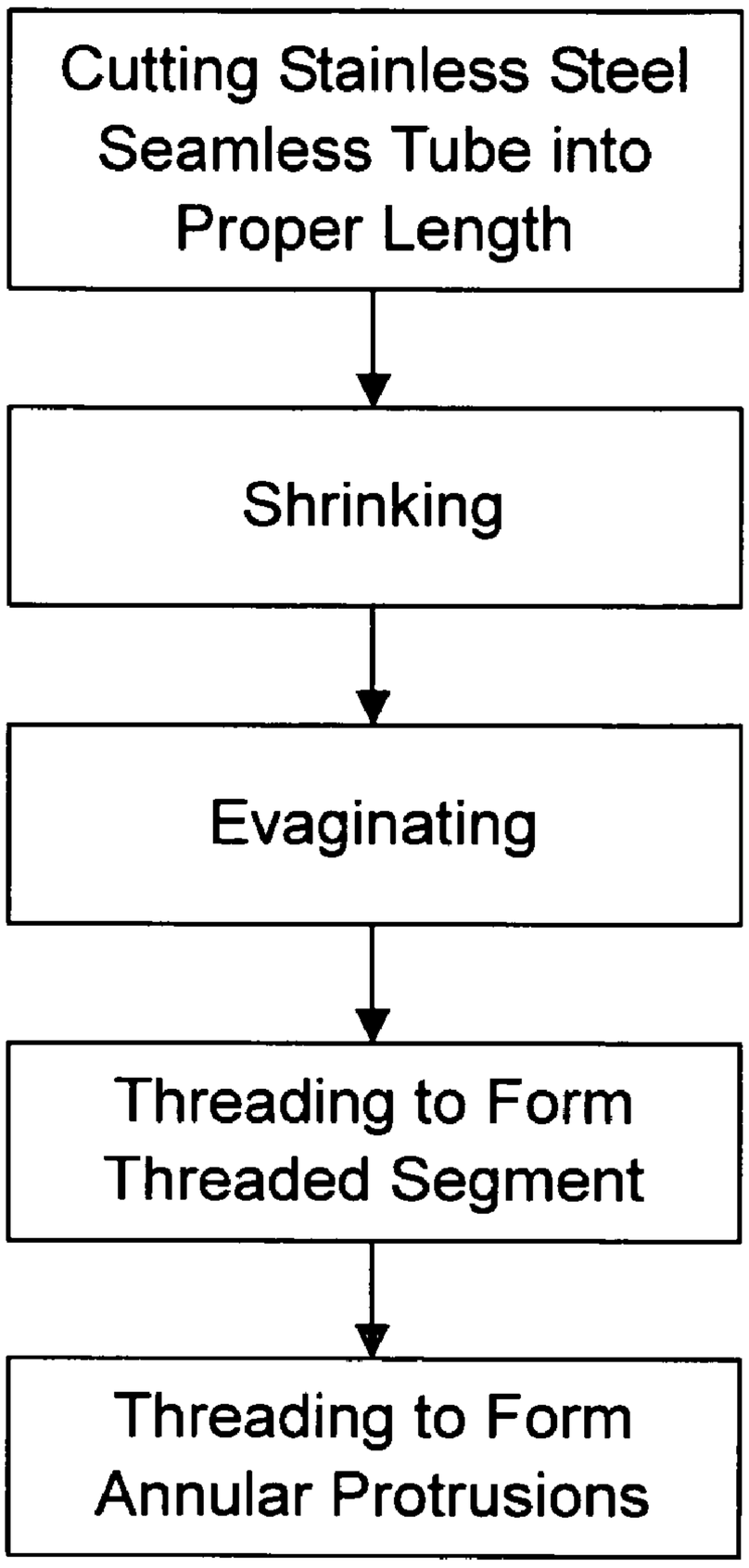
Cutting Stainless Steel Seamless Tube into Proper Length
Shrinking
Evaginating
Threading to Form Threaded Segment
Threading to Form Annular Protrusions

FIG. 7

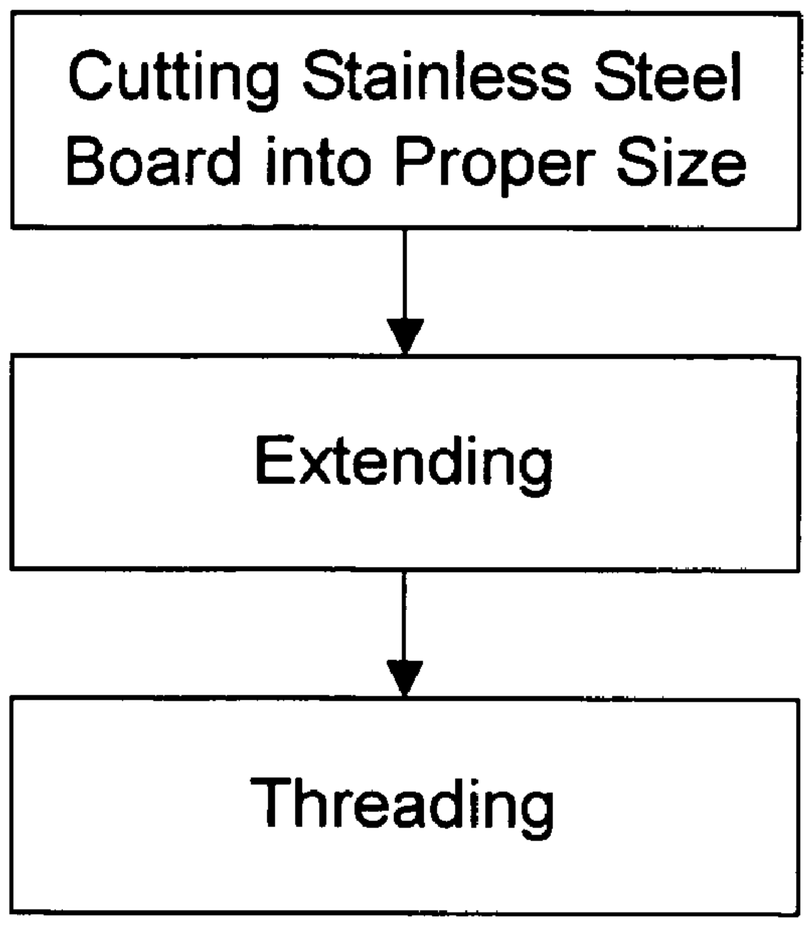
Cutting Stainless Steel Board into Proper Size
Extending
Threading

FIG. 8

SCUPPER JOINT FOR SHIP

BACKGROUND OF THE INVENTION

1. Technical Field

The present invention relates to scupper joints for ships. More particularly, the present invention relates to a scupper joint provided at a lower lateral portion of a ship hull, wherein the scupper joint is connected with a pumping plant installed in the ship hull for allowing water drawn by the pumping plant to be discharged out of the ship hull through the scupper joint.

2. Description of Related Art

Referring to FIG. **1**, on a ship, a plurality of scupper joints **1** provide at a lower lateral portion of a ship hull are connected with a pumping plant in the ship. The pumping plant serves to draw water from a bottom tank or a cooling system of the ship and discharge the water out of the ship through the scupper joints **1**.

The conventional scupper joint, as shown in FIG. **2**, comprises a tubular body **10** and a locking ring **11** that is mounted around and thereby coupled with the body **10**. The body **10** is axially, centrally formed with a through hole **101**. The body **10** is also peripherally formed with a flange **12**, a threaded segment **13** and a connecting segment **14**. Another threaded segment **111** is formed at an inner periphery of the locking ring **11** for getting coupled with the threaded segment **13** of the body **10**. By screwing the locking ring **11**, the locking ring **11** is tightened and moves along the threaded segment **13** of the body **10** so that adjacent surfaces **122**, **112** of the flange **12** and the locking ring **11** pressingly abut against an inner lateral **191** and an outer lateral **192** of a hull **19** of the ship, respectively. Some protrusions **141** are formed at an outer periphery of the connecting segment **14** for facilitating combination between the connecting segment **14** and an external plastic pipe **15**. When the plastic pipe **15** is further communicated with a pumping plant, water pumped by the pumping plant can be discharged out of the ship through the hole **101** of the body **10**.

For preventing rust thereon, the body **10** and the locking ring **11** are usually made of stainless steel through a casting process and then processed to have the aforementioned threaded segments and protrusions. Since the casting process requires a long production cycle in addition to expensive modules, for satisfying buyers' unscheduled component demands, the manufacturing may have to produce for inventory, thus adding burden to inventory turnover and management. Besides, while being hedged about the availability of existing modules, provision of the products is far from flexible. On the other hand, through the casting process, it is difficult, if not impossible, to make the body **10** have a wall thickness less than 2 mm without causing a high defective rate.

Consequently, the resultant scupper joint is bulky and heavy, thus requiring increased packing and transporting costs.

Moreover, the body **10** made of stainless steel can still rust after long-term contact with water. As a result, the rust scales can block the hole **101** and significantly weaken the discharging capacity of the scupper joint, rendering a shortened service life of the scupper joint. In view of this, some known approaches have suggested further preventing rust by making the parts with anticorrosive metal materials, such as titanium alloy. However, the expensive materials make the products become too expensive to be classed as economical. Other processes, such as vacuum casting and powder metallurgy, have been proposed as alternative approaches to make the wall thickness of the body **10** thinner than 2 mm. Nevertheless, theses processes require remarkable costs in modules and operation as compared with the aforesaid casting process does. As a result, the expensive processes make the products become too expensive to be classed as economical.

SUMMARY OF THE INVENTION

Hence, the primary objective of the present invention is to provide a scupper joint for a ship, wherein the scupper joint is not made through the known casting process or powder metallurgy process. Instead, the scupper joint has a body based on a piece cut from a seamless stainless steel tube that receives some known processes to have its designed configuration. As compared with the conventional scupper joints, the subject matter of the present invention is advantaged by saving costs in manufacture, development, packing and transportation, reducing a production cycle, thinning the scupper joint, ensuring discarding capacity, less burdening the ship, being highly anticorrosive, and being flexible to meeting customers' various components demands.

To achieve this and other objectives of the present invention, the scupper joint of the present invention comprises: a body, having a tubular structure as a piece cut from a seamless tube, wherein the tubular structure is processed to have a first section and a second section, the first section having a flange at one end thereof as an evagination and a threaded segment at an outer periphery thereof, and the second section having at lease one annular protrusion at an outer periphery thereof; and a nut, having an annular structure as a piece cut from a stainless steel board, wherein the tubular structure is processed to have an end evaginated to form a flange and is processed to have an inner periphery threaded to form a threaded segment, wherein the threaded segment of the nut and the threaded segment of the first section are configured to couple with each other.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention as well as a preferred mode of use, further objectives and advantages thereof will be best understood by reference to the following detailed description of an illustrative embodiment when read in conjunction with the accompanying drawings, wherein:

FIG. **1** is a schematic drawing showing scupper joints provided on a ship;

FIG. **2** is a sectional view of a conventional scupper joint made through a casting process;

FIG. **3** is an exploded view of a scupper joint of the present invention;

FIG. **4** is an assembled view of the scupper joint of the present invention;

FIG. **5** is a lateral view of the assembled scupper joint of the present invention;

FIG. **6** is a sectional view of the scupper joint of the present invention;

FIG. **7** is a flowchart for manufacturing the scupper joint of the present invention; and

FIG. **8** is a flowchart for manufacturing the nut of the scupper joint of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

While a preferred embodiment is provided hereinafter for illustrating the concept of the present invention as described above, it is to be understood that the components of the embodiment shown in the accompanying drawings are

depicted for the sake of easy explanation and need not to be made in scale. Moreover, in the following description, resemble components are indicated by the respectively identical numerals.

Please refer to FIGS. **3** through **6**. A scupper joint disclosed in the present invention comprises a body **20** and a nut **30** that is mounted around and thereby coupled with the body **20**.

The body **20** has a tubular structure that includes a first section **21** and a second section **22**. The first section **21** and the second section **22** are intercommunicated and extending linearly, axially inside the body **20**. Therein, the second section **22** is formed through a tube reducing process so that its inner diameter and its outer diameter are smaller than those of the first section **21**. An open end of the first section **21** is evaginated to form a flange **23** and an outer periphery of the first section **21** is formed with a threaded segment **24**. A plurality of annular protrusions **25** are provided at an outer periphery of the second section **22**.

The nut **30** has an annular structure whose one end has a flange **31** and an opposite end has a ring portion **34**. The flange **31** comprises a tool-positioning portion. In the present embodiment, the tool-positioning portion is composed of four holes **32** each separated by 90 degrees from adjacent said holes **32** along an outer periphery of the flange **31**. The holes **32** are provided to facilitate positioning a hand tool when the hand tool is operated by a user to tighten the nut **30** that has a threaded segment **33** formed on an inner periphery thereof.

The body **20** is settled in a hole **41** preformed on a ship hull **40**. Then the nut **30** and the body **20** are mutually coupled by the threaded segments **33**, **24** thereof. By screwing the nut **30**, the nut **30** is tightened and moves along the first section **21** so that the flanges **23**, **31** pressingly abut against an inner lateral **401** and an outer lateral **402** of the ship hull **40**, respectively, thus positioning the scupper joint of the present invention on the ship hull **40**. A pumping plant, as described previously, is connected to the second section **22** through a plastic pipe **42**. At this time, the annular protrusions **25** and an inner periphery of the pipe are mutually interfered and thus firmly engaged without risk of unintentional separation. Afterward, water drawn by the pumping plant can be discharged out of the ship through the scupper joint. In addition, any known waterproofing approach, such as applying silicon gel or using water-stop tape, may be implemented at a border between the body **20** and the hole **41** of the ship hull **40** so as to eliminated any interval therebetween, thereby preventing external water coming into the ship hull **40**.

The body **20** is based on a piece cut from a seamless stainless steel tube and has a predetermined length. Then the piece after receiving processes for evaginating, threading, and partially shrinking has the flange **23**, the threaded segment **24**, the second section **22** and the annular protrusions **25**. FIG. **7** shows a flowchart for manufacturing the body **20**, therein, following steps are performed:

Step **1**: cutting a piece with a predetermined length from a seamless stainless steel tube;

Step **2**: conducting a tube shrinking process to form the second section **22**;

Step **3**: conducting an evaginating process to form the flange **23**;

Step **4**: conducting a threading process on the first section **21** to form the threaded segment **24**; and

Step **5**: conducting a threading process on the second section **22** to form the annular protrusion **25** so as to complete the body **20**.

Therein, Step **2** and Step **3** may be exchanged in order.

The nut **30** is based on a piece with a predetermined size cut from a stainless steel board. Then the piece after receiving processes for extending and threading, has the flange **31**, the ring portion **34**, the threaded segment **33** and the hole **32**. FIG. **8** shows a flowchart for manufacturing the nut **30**, therein, following steps are performed:

Step **1**: cutting a piece with a predetermined size from a stainless steel board, wherein the piece has the hole **32** and the different hole to be later threaded;

Step **2**: conducting an extending process to form the flange **31** and the ring portion **34**; and

Step **3**: conducting a threading process in the ring portion **34** to form the threaded segment **33** so as to complete the nut **30**.

Both the body **20** and the nut **30** are not made through the conventional casting process or powder metallurgy process. Instead, the body **20** is based on a piece cut from a seamless stainless steel tube while the nut **30** is based on a piece cut from a stainless steel board, both receiving known processing processes to form the body **20** and the nut **30** having the designed configurations. As compared with the conventional scupper joints, the present invention provides the following outstanding benefits.

The present invention facilitates saving the costs for casting modules and reducing the production cycle, thus eliminating the need of producing for inventory. Consequently, problems related to inventory turnover and management can be eliminated.

The present invention allows the body **20** to be made by cutting any seamless stainless steel tube meeting users' needs in diameter and length, thereby improving flexibility in manufacture of the body **20**.

To improving economic and processing benefits, the seamless stainless steel tube may have a wall thickness of 2 mm. While the outer periphery of the body **20** is usually fixed to meet general specification required in ship industry, a thinner wall thickness of the adopted seamless stainless steel tube helps to increase the inner diameter of the body **20**, and in turn increase the discharging capacity of the scupper joint. Also, the body **20** with less wall thickness is relatively light, thereby reducing the transportation cost and less burdening the ship.

Since the body **20**, in use, comes to direct contact with water, the seamless stainless steel tube applied in the present invention is preferably one made of a material having excellent anticorrosive ability (such as low-carbon stainless steel) so as to ensure the anticorrosive and rust-proof ability of the body **20**, thereby maximizing the service life of the scupper joint. On the other hand, the nut **30** that contacts no water in use may be made of a stainless steel board with relatively high carbon concentration, so as to reduce the material cost.

It is to be noted that the body **20** of the present invention shall be made of seamless stainless steel tubes only because steel tubes with welding seams can have cracks on the evagination and fail to meet industrial requests in dimensions. Besides, with identical steel properties, seamless stainless steel tubes present better anticorrosive ability than steel tubes with welding seams do.

The present invention has been described with reference to the preferred embodiment and it is understood that the embodiment is not intended to limit the scope of the present invention. Moreover, as the contents disclosed herein should be readily understood and can be implemented by a person skilled in the art, all equivalent changes or modifications which do not depart from the concept of the present invention should be encompassed by the appended claims.

What is claimed is:

1. A scupper joint for a ship, the scupper joint comprising:

a body, having a tubular structure as a piece with a predetermined length cut from a seamless tube, wherein the

tubular structure is processed to have a first section and a second section, wherein the first section has a flange at one end thereof as an evagination and a threaded segment at an outer periphery thereof; and

the second section has at lease one annular protrusion at an outer periphery thereof; and

a nut, having an annular structure with the nut having:

a flange at an end thereof; and

a threaded segment at an inner periphery thereof,

wherein the threaded segment of the nut and the threaded segment of the first section are configured to couple with each other wherein the nut flange comprises a tool-positioning portion, and wherein the tool-positioning portion is four holes each separated by 90 degrees from adjacent said holes along an outer periphery of the flange.

2. The scupper joint of claim **1** wherein the second section is formed through a tube reducing process so that an inner diameter and an outer diameter of the second section are smaller than an inner diameter and the outer diameter of the first section.

3. The scupper joint of claim **1** wherein the seamless tube is made of stainless steel.

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